

XLIII.—*Researches on Cosmetira salinarum, a new Paludicolous Medusa of the Environs of Cette.* By Dr. DU PLESSIS*.

THE Medusæ are almost exclusively pelagic zoophytes, inhabiting the open sea. They form a great part of the transparent and gelatinous animals that we meet with floating at the surface or at various depths under water.

These creatures dread nothing more than fresh water, which is a destructive poison to them. Even brackish water, that of the sea mingled with more or less fresh water, kills them instantaneously. Moreover they constantly need a water rich in oxygen, fresh and incessantly renewed by the perpetual movement of the waves and currents. The Medusæ, in fact, have an almost equal dread of fresh water, of stagnant sea-water, and of a slightly too high temperature. All these considerations will enable the reader to understand how we were surprised, at the end of the month of June 1876, at finding, in the middle of the discharging-canal of the salt-works of Villeroy, near Cette, a charming Medusa, of a new species, which inhabits these salt marshes in the summer.

It belongs to the genus *Cosmetira*, a section of the numerous group of the Oceanidæ; and it is curious that it is a miniature copy of a much larger species, *Cosmetira punctata*, which occurs frequently in the sea near Cette, and at Nice, Naples, and elsewhere.

All the interest possessed by this pretty little Medusa is concentrated around the novel conditions to which this frail and charming creature must have accommodated itself in order to be able to exist in the localities where we now meet with it. The canal, which serves for the discharge of the salt works of Villeroy, is a narrow trench, not more than 2 or 3 metres broad, and never exceeding 1 metre in depth. The soil is formed throughout of a black putrid mud, stinking of sulphuretted hydrogen. The water is perfectly stagnant, for this canal, which is several leagues in length and surrounds all the salt-pans like an immense oval, is almost completely horizontal. Except for the imperceptible currents caused by the strong winds which sometimes blow over the pool of Thau (into which this canal opens by several passages), the water is therefore most frequently quite immovable. It is a true marsh-ditch, such as may be seen in the canals of the plain of the Orbe, canals which in all points resemble

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that of which we now speak, even as regards the physiognomy of the vegetation; for in both places a cincture of murmuring reeds fringes the banks, and the surface shows great accumulations forming actual islets of brown and green marine Algæ. These are Confervaceæ of the genera *Chaetophora*, *Cladophora*, *Bryopsis*, &c. These mingled masses harbour a multitude of creatures of all the divisions of the animal kingdom from fishes to Zoophytes, Infusoria, and Rhizopods.

It was in exploring the floating islets that we discovered, in the middle of the canal, half way between Cette and Agde, the creatures under consideration. These little bells were always found suspended by their long tentacles from the lower surfaces of the masses of Algæ. They thus found food and shelter, protected from the sun.

In fact this is the place to remark that, in the summer months, the water of this long shallow canal, flanked by hot sands and without any shade, is almost all day long exposed to the burning sun of Languedoc, and often exceeds 25° C. (77° F.) in temperature. When the arms or legs are immersed in it the impression of a tepid bath is produced.

Moreover this water is very brackish. In the first place it is recruited by the pool of Thau, which is itself very far from being pure sea-water. This lagoon receives the southern canal, which opens into it near Agde, and pours into it an immense quantity of fresh water; several small streams and the springs of l'Abîme and Enversac also discharge into it. But, in addition, the canal of the salt-works is constantly receiving the mother liquor of the pans from which the salt has been obtained; frequently the canal is overflowing with water which is sea-water less the salt, that is to say, without its essential part. The strength and concentration of this brine vary according to the state of the works, the dryness or humidity of the season, storms, &c. In summer it is very concentrated, in winter very dilute.

How could we expect at so many leagues from the sea, and with no communication with it except through the immense lagoon of Thau, to find a *Medusa*, that is to say, one of the creatures most difficult to suit in the matter of its watery medium?

Every zoologist who has attempted to keep these creatures in captivity has been reduced to despair by seeing them perish in a little time, whatever may have been done to render the aquarium comfortable for them. But this marsh species that we had just discovered, forced, no doubt, by vital competition to accommodate itself very gradually to great

vicissitudes, has become hardened by this process; and the proof of this is that it may be very well preserved for weeks together in the smallest bottles, with a few hundred grammes of the water of the canal and a few green Algæ to keep up a small supply of oxygen. Under these circumstances we have transported specimens with the greatest facility from Cette to Lausanne, and kept them for months without the least trouble. This species, being so accommodating, will be very welcome to those who desire to observe these animals for a long time in captivity.

We are aware, indeed, that *Cludonema radiatum*, Duj., and other microscopic Medusæ also bear captivity; but these are creatures scarcely visible to the naked eye, whilst ours, being of the size of a half-franc (Swiss money), is much more suitable for all sorts of manipulation.

Moreover (and this is the most interesting point) it presents one of the clearest examples of the influence of the circumambient medium upon the gradual modification and, finally, transformation of one species into another; for certainly our Medusa has originated from an importation through the pool of Thau of the large *Cosmetira punctata*, the form of which it reproduces on a small scale, repeating its whole organization *en diminutif*.

Description.

Form. In repose the animal resembles a little basin or saucer, the circumference of which is furnished with long and equal fringes. These fringes are the *tentacles*; and the basin is what is called the *umbrella*.

In motion (that is to say, when the animal swims by alternately contracting or relaxing the muscles of the umbrella) the form becomes that of a more or less open bell, according to the muscular contraction.

At the bottom of this bell, starting from the centre of the cup, hangs a clapper in the form of a bottle with a quadrangular neck. This clapper is the trunk [*manubrium*], which can elongate and contract, become rounded, and turn and bend in all directions to enable the animal to seize the animalcules upon which it feeds. The end of the trunk terminates in four angles, surmounted by a small knob or inflation. Even in repose it passes beyond the margin of the umbrella; it is therefore longer than the depth of the bell.

Size. Usually the bell or umbrella when spread out scarcely exceeds the dimensions of a half-franc or piece of 50 centimes (Swiss money). Very old examples, however, sometimes attain the size of a franc, and the young are scarcely above

that of a piece of 5 centimes. As the size increases, the number of tentacles which border the umbrella increases also.

Colours. The umbrella is transparent and limpid, like cut crystal. It is traversed in the form of a cross by four canals starting at right angles from the centre of the umbrella, where the trunk and stomach are implanted, of which they are the continuation. These gastrovascular canals are of an amber-yellow or reddish tint, darker or lighter in different specimens; and they are bordered nearly to the margin of the umbrella by a very elegant green fringe, folded like a shirt-frill, and containing the ova in the females and the spermatozoids in the males.

The four canals reach the margin of the umbrella, and there open into a circular canal, which borders its periphery. This periphery is not simply sharp-edged, but it bears a veil or circular border of a red colour, which, by erecting itself, closes a part of the opening of the bell, and bears in the centre only an orifice large enough for the passage of the trunk. It is a regular mobile diaphragm. It is thus reddish like the canal. The trunk from which the latter starts is of a malachite-green colour, with its quadrate lower extremity marked at the four corners with spots of a superb violet. These same violet spots also occur in some old examples along the folded fringes of the gastrovascular canals and at the bottom of the stomach.

The tentacles, which flow in elegant fringes from the edge of the umbrella, are in repose conical and pointed, and all of equal length. They are ringed, at equal intervals, by small black inflations; and when they are contracted they, in consequence, appear quite black by the approximation of these rings, which are only cushions of urticating batteries which the medusa makes use of to strike its prey. When elongated these tentacles may exceed ten times the length of the body. They then appear grey by the separation of the rings, and, from being conical, become cylindrical.

Between these tentacles at regular intervals there are also some little reddish sacs, which contain a pigment spot and some crystalline concretions. These marginal corpuscles are rudimentary organs of sense. To the naked eye they appear like a row of very small reddish pins' heads.

From the preceding it will be seen how elegant are the form and coloration of the animal. When it springs from the bottom, swimming with the rapidity of lightning, the long fringes of the umbrella extend through the water, and make for it a cloudy train like the tail of a comet.

Habitat. The canal of the salt-works of Cette, near the

footbridge of a station at an equal distance from Cette and Agde. The Medusa always inhabits the lower surface of the islets of floating Algæ. On removing these it is seen clinging like a flake of jelly, shining like crystal. On reimmersing these Algæ in the water the frightened Medusæ separate by swimming in all directions, which is a very pretty sight. The season of their occurrence is limited to June and July. We did not find them in September and October, any more than in the spring.

Relations with Allied Species. In the sea which approaches the canal of the salt-works, and also in the great canal of the lagoons, we find a Medusa of the same genus (*Cosmetira punctata*). This is always at least as large as a crown piece. It only occurs in pure and fresh sea-water. It has exactly the same form and proportions and the same organs as the species from the salt-works, but all on a larger scale.

The colour is very different; all the tints are lighter. The umbrella, the velum, and the tentacles are colourless. The gastrovascular canals and the trunk are scarcely tinged with reddish. The genital fringes are of a delicate rose-colour, as also the angles of the trunk.

Thus, reduce the whole animal to the dwarf size of a half-franc piece, colour the canals and the stomach green, change the rose-colour into violet, blacken the tentacles, and you have by these modifications transformed the *Cosmetira* of the sea into that of the salt marshes. It is these peculiarities which make us believe that our species may perhaps be derived from an emigration, with slow transformation, of *Cosmetira punctata*. This is why we present this new-comer as being at present perfectly separated from its starting-point, from which it is distinguished by its size, its colours, and, especially, its domicile. This is also why we name it *Cosmetira salinarum*, to indicate its strange place of abode.

MISCELLANEOUS.

Note on two Bermuda Fishes recently described as new.

By Dr. A. GÜNTHER.

IN the February number of this Journal, page 150, I described two new species of fish from the Bermudas, named *Gerres Jonesii* and *Belone Jonesii*, in which Mr. G. Browne Goode believes he has recognized two fishes previously described by himself (Amer. Journ. 1879, April, p. 340).

With regard to the former, *Gerres Jonesii*, I beg to observe that,